In the Figures

Please amend Figure 1 as indicated in red ink on the attached sheet. The amendment is difficult to illustrate in ink, so a substitute sheet is submitted herewith for the Examiner's consideration.

REMARKS

Claims 1-41 are pending in the above-identified application; of these, claims 1-4, 6-14, 16, 19-25, and 30-32 are rejected; claims 5, 15, 17, 18, 33, and 34 are objected to, and claims 35-41 are subjected to a restriction requirement. Applicants, having amended the application, respectfully request reconsideration.

Election of Claims

The Examiner subjected the claims to a restriction requirement, in response to which Applicants' attorney provisionally elected to prosecute claims 1-34. Applicants hereby affirm this election.

Amendments to the Specification

Applicants have amended paragraph **0054** of the specification to clarify an aspect of Applicants' embodiment of Figures 33A and 33B. The last sentence of that paragraph notes:

> the actuator is designed so that the reflective surface 3323 is as great a percentage of the total actuator area (including the exposed portions of the actuator support) as practical, which is over 25% in the depicted embodiment.

(Specification, paragraph **0054**, emphasis added to show addition.)

The cited area efficiency relays the point that the mirror surface is large relative to the amount of area occupied by the entire actuator. In Figure 33A, for example, the entire actuator assembly is bounded by silicon 3330, to which the moving portions of the actuator assembly are electrically connected -- and from which the moving portions are suspended -- via hinges 3319T/B. The "total actuator area" referred to in paragraph **0054** is the

area occupied by the various features of Figure 33A bounded by areas 3330, including the combs, frame, actuated member, and the interstitial spaces exposing the underlying actuator support. This understanding is supported in Figures 33A and 33B, in which reflective surface 3323 is just over 25% of the total area bounded by, but not including, silicon 3330. In light of this and other support, the amendment does not introduce new matter.

Amendments to the Figures

Applicants amended Figure 1, as shown in red ink on the attached sheet. The amendment is difficult to highlight in ink, so the amended portion is reproduced below for ease of review. The amendment is supported in Figure 1A (the other frame hinge 119T is correctly attached) and Figure 1B, which shows the bottom half 119B associated with top half 119T. No new matter is added.

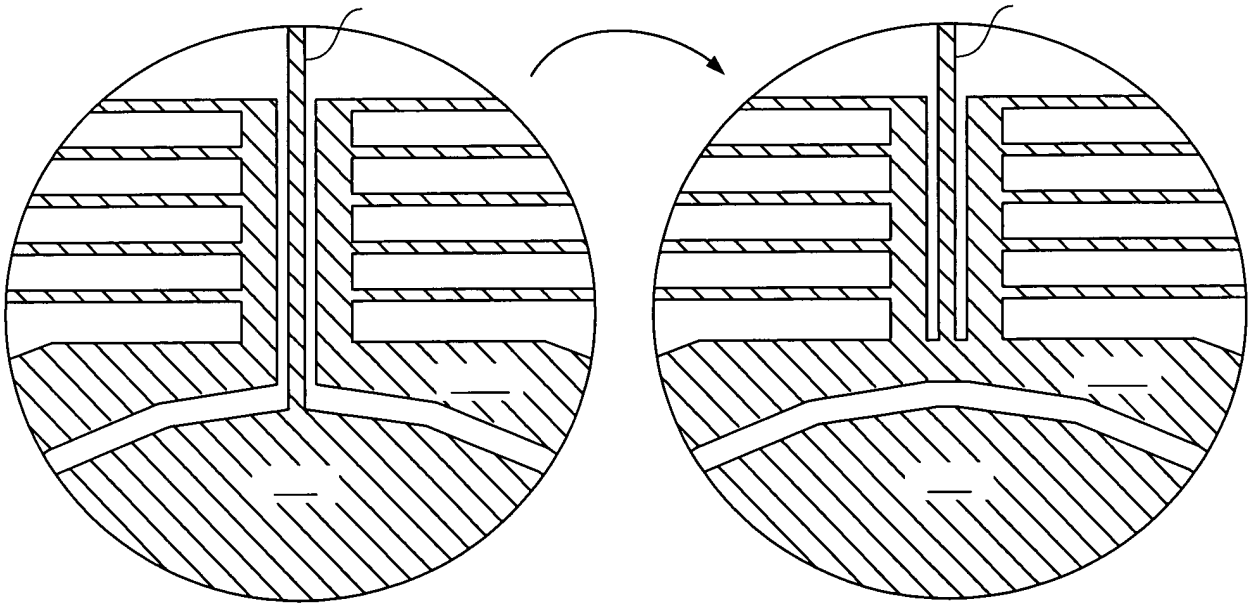

Figure 33A is amended to consistently number region 3330. The correction is obvious, and does not introduce new matter.

Rejections under 35 U.S.C. section 102(e)

The examiner rejected claims 1-4, 6-10, 12-14, 16, 19-25 and 30-32 under 35 U.S.C. 102(e) as being anticipated by Behin et al. (U.S. 2002/0005976 A1). Applicants deal with each rejection in turn.

Claims 1-4

Claims 1-4 are canceled, rendering their rejections moot.

Claims 6-10

Claims 6 and 7 are canceled, rendering their rejections moot. Claim 8 is amended to depend from claim 5, and so is allowable for at least the same reasons claim 5 is allowable. Claim 9 depends on claim 8, and is thus allowable for at least the same reasons claim 8 is allowable.

Claims 12-14

Regarding claim 12, the Examiner points to Behin et al. as teaching a mirror surface that occupies an area "at least one fourth the area" of the actuator assembly (Office Action, page 7).

Claim 12 is amended to recite an actuator with a mirror surface in which the actuator assembly "occupies a first area … and the mirror surface occupies a second area at least one fourth the first area." Claim 12 focuses on an area efficiency provided by some embodiments of Applicants' invention, actuator assembly 3300 of Figures 33A and 33B being one example. In that example, the mirror surface 3323 is just over a fourth of the area

occupied by the actuator assembly, or the area bounded by silicon 3330. Other embodiments are more or less area efficient. For example, the embodiment of Figures 1A and 1B has a reflective surface of an area between 20% and 25% of the total actuator area bounded by surrounding silicon 130, and the embodiment of Figures 72A and 72B has a reflective surface of an area greater than 50% of the area bounded by the surrounding silicon.

In contrast to Applicants' area-efficient layouts, the structure depicted in Figure 1D of Behin et al. includes a relatively small reflective surface. In the depicted layout, Behin's actuator assembly is bounded by substrate 102 and includes a rotating element 106 that might be a mirror surface. The area occupied by rotating element 106 is far less than 25% of the total area occupied by the actuator, as evident by the ample white space surrounding element 106. Assuming the structure of Behin's Figure 1D is to scale, the element 106 occupies less than about 10% of the total area occupied by the actuator.

Other Behin structures are more area efficient than that of Figure 1D. Referring to Behin's Figure 1A, for example, element 36 occupies a significantly greater percentage of the total actuator area than does element 106 of Figure 1D. The device of Figure 1A is a simpler, uniaxial actuator, however, and does not include a number of the elements of Applicants' claim 12, including e.g. the "member frame." Nothing in Behin et al. teaches or suggests the area-efficient multi-axial actuators of Applicants' claim 12. The rejection of claim 12 should therefore be withdrawn.

Claim 13 depends on claim 12, and is therefore distinguishable over Behin et al. for at least the same reasons claim 12 distinguishes.

Claim 14, as amended, recites an actuator assembly that

includes "a movable comb formed in [a] conductive layer" and "a hinge formed in the conductive layer…wherein the hinge is thinner than the movable comb…" The Examiner points to elements 34 of Behin's Figure 1A and element 110 of Behin's Figure 1D as meeting similar language of originally filed claim 14.

In amended claim 14, the hinge and movable combs are formed in the same material layer, and the hinge is nevertheless thinner than the movable comb. This structure is created using the process steps illustrated, for example, in Figures 54-65.

First, regarding elements 34 of Behin's Figure 1A, that element appears to be illustrative, and not an actual device feature. (Behin et al. describe elements 34 at paragraph **0023**.) If elements 34 correspond to physical features, Behin et al. is not enabling as to this feature, as they make no mention of how to pattern a horizontal, rod-shaped element along with comb fingers 24 in a common conductive layer. Second, regarding element 110 of Behin's Figure 1D, that hinge structure appears to be formed in the same conductive layer as combs 113 and 114, but there is no teaching or suggestion to make element 110 thinner than the combs. The rejection of claim 14 should therefore be withdrawn.

Claim 16

Claim 16 depends on claim 14, and is therefore allowable for at least the same reasons claim 14 is allowable.

Claims 19-25

Claim 19 is amended to depend from claim 18, which the Examiner objected to as being dependent upon a rejected base claim. Applicants amended claim 18 to include the relevant base claims, so claim 18 is in condition for allowance. Claim 19

depends on claim 18, and is therefore also in condition for allowance. Claims 20-22 likewise depend from claim 18, and are thus likewise in condition for allowance.

Claim 23, as amended, recites an actuator assembly that includes movable comb teeth of varying length. The examiner deemed claim 18 allowable, at least in part for that claim's recitation of comb teeth of varying length. Claim 23 is therefore allowable for reasons similar to claim 18.

Claims 24 and 25 depend from claim 23, and are therefore allowable for at least the same reasons claim 23 is allowable.

Claims 30-32

The rejections of claims 30-32 are moot in light of their cancellations.

Rejections under 35 U.S.C. 103

Claim 11 stands rejected under section 103(a) as being unpatentable over Behin et al. and Miller et al. (U.S. 2002/0171327 A1). Claim 11 is canceled, rendering the rejection moot.

Allowable Subject Matter

Claims 26-29 are allowed. Claims 5, 15, 17, 18, 33 and 34 are objected to as being dependent upon rejected base claims. Applicants have therefore rewritten claims 5, 15, 17, 18, 33, and 34 in independent form to place them in condition for allowance.

New Claim

New claim 76 depends is supported, for example, by the embodiment of Figures 1A and 1B, as discussed above in connection with the rejection of claim 12. Claim 76 depends on claim 12, and therefore distinguishes the cited references for at least the same reasons claim 12 distinguishes.

CONCLUSION

In light of the foregoing remarks and amendments, the pending claims are in condition for allowance; accordingly, Applicants respectfully request a notice of allowance. If the examiner's next action is other than allowance of the pending claims, the Examiner is requested to call Applicants' attorney at (925) 621-2113.

Respectfully submitted,

Arthur J. Behiel
Reg. No. 39,603

I hereby certify that this correspondence is being deposited with the United States Postal Service as first-class mail in an envelope addressed to: Mail Stop, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450. on December 23, 2003

Laurie Moreno
Name

Signature

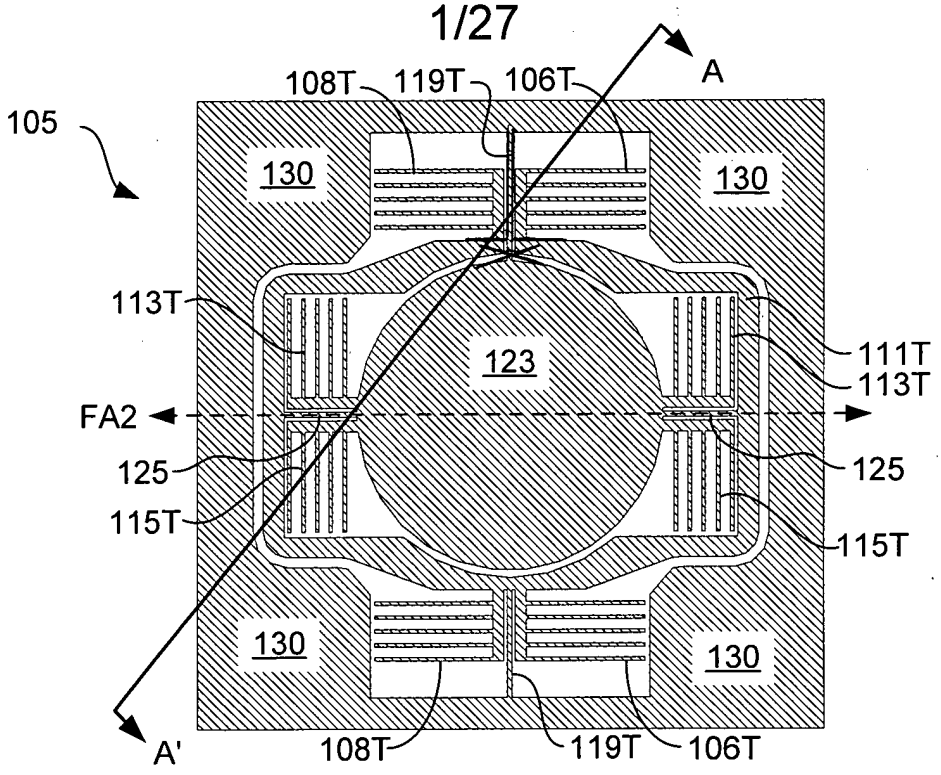

FIG. 1A

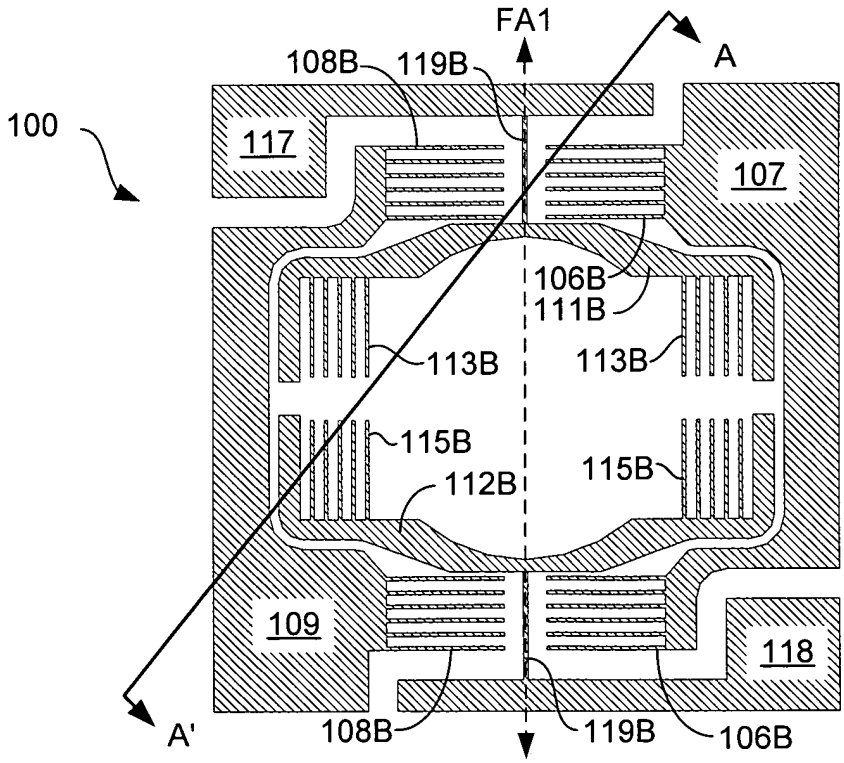

FIG. 1B

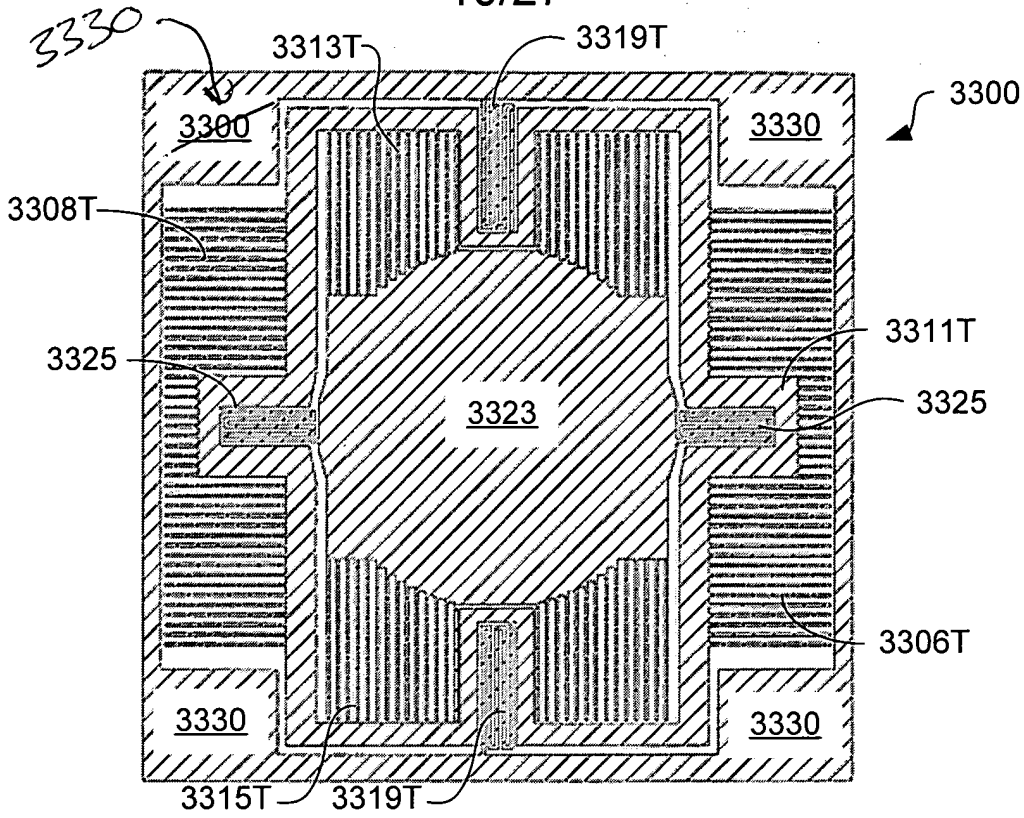

FIG. 33A

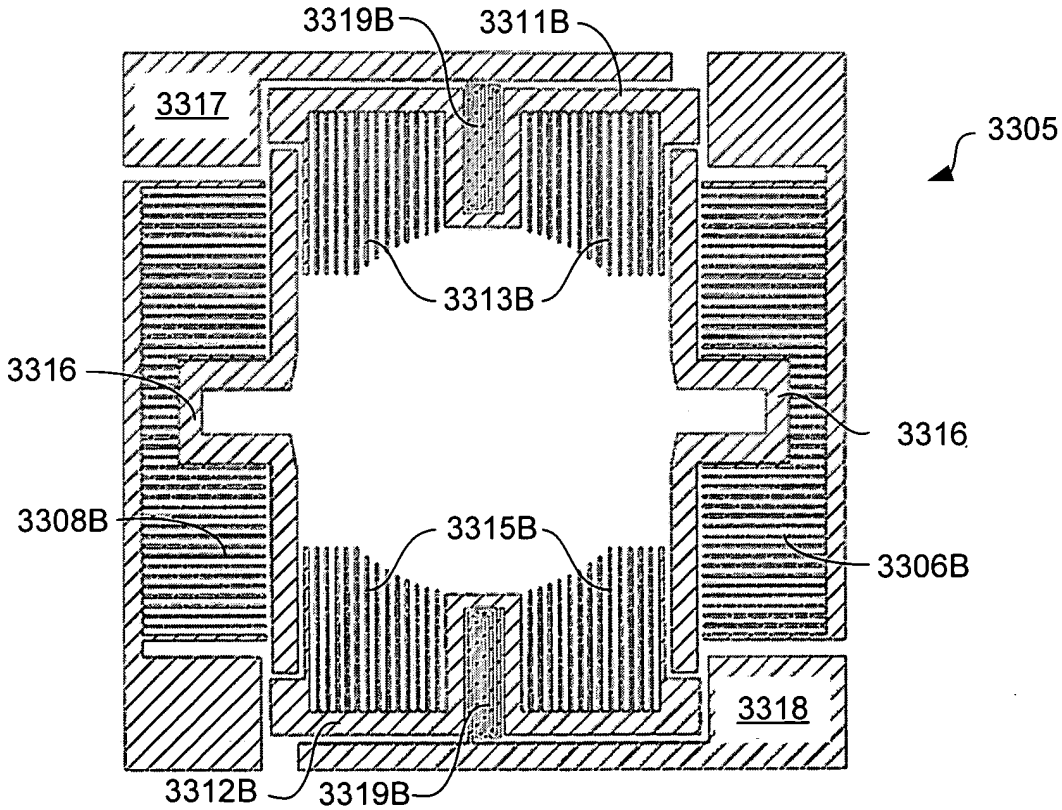

FIG. 33B